

What is claimed is:

1 *Cut*
 2 *Sub A* 1. A method for characterizing ingress events in a network environment having return
 3 path communications being accomplished in a plurality of frequency bands, the method
 4 comprising the steps of:

5 (a) detecting one or more ingress events in the return path over a pre-determined
 6 time period;

7 (b) marking the frequency band wherein each ingress event exceeds a pre-
 8 determined threshold;

9 (c) marking each time interval in which the ingress events exceeds a pre-
 10 determined threshold; and

11 (d) creating a time/frequency map of the ingress events, wherein the time/frequency
 map contains the results of steps (b) and (c).

1 2. The method of claim 1 wherein the time/frequency map is characterized by marking
 2 each ingress event that exceeds the pre-determined threshold with a "1".

1 3. The method of claim 1, further comprising the step of:

2 (e) evaluating the time/frequency map; and

3 (f) mitigating the return path ingress, based on the evaluation of the time/frequency
 4 map.

1 4. The method of claim 3 wherein step (f) is accomplished by attenuating the return path
 2 signal.

1 5. The method of claim 4 wherein the attenuation is performed based on a power-level
 2 equalization algorithm.

1 6. The method described in claim 3 wherein step (f) is accomplished by isolating the return
 2 path signal.

1 7. The method of claim 3, further comprising the steps of:

(e) summing the results of the marking process of step (c) across a plurality of frequency bands within a specific time interval.

8. The method of claim 7, further comprising the steps of:

(f) labeling the ingress event as a wideband ingress event if the sum obtained in step (e) exceeds a pre-determined wideband ingress threshold.

9. The method of claim 7, further comprising the steps of:

(f) labeling the ingress event as a narrowband ingress if the sum obtained in step (e) is below a pre-determined narrowband threshold.

10. The method of claim 1, further comprising the steps of:

(e) summing the results of marking process of step (c) across a plurality of time intervals within a specific frequency band.

11. The method of claim 10, further comprising the step of:

(f) labeling the ingress event as a narrowband ingress event when the sum obtained in step (e) exceeds a pre-determined narrowband ingress threshold.

12. The method of claim 10, further comprising the step of:

(f) labeling the ingress event as wideband ingress when the sum obtained in step (e) exceeds a pre-determined wideband ingress threshold.

13. The method of claim 1 wherein the step (a) occurs at the head-end.

14. The method of claim 1 wherein the step (a) occurs substantially near the subscriber location.

15. The method of claim 1 wherein the step (a) occurs at a test point in the network.

16. The method of claim 1 wherein the step (a) occurs at a head-end of the network.

1 17. The method of claim 1 wherein the step (a) utilizes ingress measurements extending
2 across the return frequency band.

1 18. The method of claim 1 wherein the step (a) takes place in a sub-band of the return
2 frequency band.

1 19. The method of claim 1 wherein the step (a) takes place in an active sub-band of the
2 return frequency band.

1 20. The method of claim 1 wherein the step (a) takes place in an inactive sub-band of the
2 return frequency band.

1 21. The method of claim 1 wherein the step (a) comprises the steps of:

- 2 (1) measuring an average return path signal power in the return frequency
- 3 band;
- 4 (2) comparing the average return path signal power to a detection threshold; and
- 5 (3) determining the presence of an ingress event in the return frequency band based
- 6 on the result of the comparison.

1 22. The method of claim 1 wherein step (a) comprises the steps of:

- 2 (1) retrieving information on channel usage to distinguish active sub-bands from
- 3 inactive sub-bands; and
- 4 (2) detecting the presence of ingress in the inactive sub-bands of the return path.
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1 23. The method of claim 22 wherein the information on channel usage is retrieved from
2 the head-end.

1 24. The method of claim 22 wherein channel usage is detected automatically at a location
2 substantially near the subscriber location.

1 25. The method of claim 1 wherein step (a) comprises the steps of:

(1) retrieving information on channel usage to distinguish active sub-bands from inactive sub-bands; and

(2) detecting the presence of ingress in the active ~~sub~~-bands of the return path.

26. The method of claim 25 wherein the information on the channel usage is retrieved from the head-end.

27. The method of claim 25 wherein the channel usage is detected automatically at a location substantially near the subscriber location.

28. The method of claim 27 wherein the automated detection of channel usage comprises the steps of:

(1) estimating a power spectrum density (PSD) of a return path signal;

(2) correlating the PSD with a set of stored PSDs;

(3) determining a frequency at peak correlation; and

(4) creating a frequency band in use.

29. The method described in claim 25 wherein the active band is in use by an in-home device.

30. The method described in claim 25 wherein the active band is in use by a communications gateway.